Code Change Proposal

780 CMR 8th Edition, Chapter 9 §909.20.5.1
Proposed MA Front End Amendments per FPFP

Proposed Code Change

Delete proposed front end amendment:

~~909.20.5.1 – Add~~
~~**909.20.5.1 High-Rise Buildings.** For high-rise buildings, a minimum of one stairway must be designed to comply with Sections 909.20.1, 909.20.2 and either 909.20.3 or 909.20.4.~~

Supporting Statement

This proposed change aligns 780 CMR-8th with the International Building Code (IBC), 2009, which allows pressurization of enclosed exit stairways as an equivalency to naturally or mechanically ventilated smokeproof enclosures, where such smokeproof enclosures are required.

Code Background

(*Prior to the inclusion of high-rise building "special use and occupancy" requirements in building codes*)

From a historical perspective smokeproof enclosures (aka Smokeproof Towers) were incorporated into buildings as means of egress enhancements over what had previously been unenclosed interior stairways and/or exterior fire escapes. A smokeproof tower consisted of a stairway located on an exterior wall, accessed by an exterior balcony; the stairway and balcony being naturally ventilated. Initially, at least one stairway was "voluntarily" configured as a smokeproof tower based on best practice; such was the case with the Building Code of the City of Boston (e.g.; 1964 & 1970 editions).

As building design evolved to include predominately center core structures, with elevators, dumbwaiters, ventilation shafts and other services located in the building core, a mechanically ventilated interior smokeproof tower was developed. Subsequently the codes prescribed that at least one smokeproof tower be provided in buildings over a certain height containing certain occupancies, allowing for use of either a naturally or mechanically ventilated configuration; such was the case with early versions of 780 CMR (e.g., 1st edition).

During the mid to late 1960s and into the 1970s numerous evaluations, studies, and tests were conducted relative to fire spread and smoke control in high-rise buildings. As part of these studies the concept of protecting stairways by pressurization rather than ventilation was investigated. On the whole, the results of these efforts demonstrated that, for sprinklered fire scenarios, pressurization was the most effective means of maintaining smoke-free conditions.

(*Subsequent to the inclusion of high-rise building "special use and occupancy" requirements in building codes*)

The original high-rise building "special use and occupancy" requirements incorporated into building codes in the early to mid 1970's allowed the building to be equipped with one smokeproof enclosure OR in fully sprinklered buildings pressurization of all required stairways; such was the case with updated versions of 780 CMR (e.g., 4th edition effective 9/1/80).

From the early-mid 1970s up through the late 1980s (1988) the code continued to require that high-rise buildings be equipped with a single smokeproof enclosure OR pressurization of all required stairways (in sprinklered buildings). Subsequently, the code was changed to require that all stairways in a high-rise building be configured as smokeproof enclosures OR pressurized stairways. In this regard the model building code as it exists today (i.e. 2009 IBC) remains unchanged.

With respect to the requirements for smokeproof enclosures and pressurized stairways, the building code requirements applicable in Massachusetts were consistent with model building codes until 1988, when a later version of 780 CMR 4th edition[1] was in effect. This version of 780 CMR 4th edition, effective May 27, 1988, deleted the stair pressurization option, leaving in place the requirement that at least one stairway be configured as a smokeproof enclosure (either naturally or mechanically ventilated); all other stairways were not required to be pressurized or configured as smokeproof enclosures.

Subsequently, 780 CMR 5th edition was promulgated, incorporating a new requirement that one stairway be a smokeproof enclosure and additionally other stairways be pressurized. In this regard the 6th and 7th editions of 780 CMR remain(ed) unchanged. The proposed 780 CMR 8th edition front end amendment to the 2009 IBC, new Section 909.20.5.1 seeks to retain this unique to Massachusetts requirement.

Technical Background

A literature search was conducted for the purpose of identifying consequence and/or risk based evaluations, studies and/or tests that provide technical support for requiring that one smokeproof enclosure (either naturally or mechanically ventilated) be provided in fully sprinklered high-rise buildings, in favor of pressurization. This literature search did not yield any meaningful technical support.

Additionally, informal inquiries were made to the FPFP Committee for copies of any technical documentation utilized during deliberations (1988 – present) related to this unique smokeproof enclosure requirement. It is our understanding that this documentation does not exist.

---

[1] 780 CMR 4th Edition is an amended version of the 1978 BOCA National Building Code. The 4th edition of 780 CMR was in effect from approximately September 1980 through February 28, 1991, with the 5th edition concurrently effective starting on September 14, 1990.

Conclusion

In my opinion, the continued inclusion of the "unique to Massachusetts" requirement that one smokeproof enclosure (either naturally or mechanically ventilated) be provided in fully sprinklered high-rise buildings, in favor of pressurization is not appropriate based on the following:

- All model building codes since the 1970s, inclusive of the 2009 IBC, allow for pressurization of exit stairways in fully sprinklered high-rise buildings, as an equivalency to providing naturally or mechanically ventilated smokeproof enclosures, which are otherwise required in buildings that are not fully sprinklered.

- There is no meaningful technical information of fire loss data that suggests the performance of a pressurized stairway(s) in a fully sprinklered building, as an alternative to a smokeproof enclosure(s), is inadequate or results in a reduced level of fire/life safety.

- With regard to fire fighter operations, the size and configuration of a smokeproof enclosure vestibule is inadequate. The model building code (2009 IBC) prescribes that a Fire Service Access Elevator be provided, such elevator being configured with a 150 sq. ft., 1-hour fire resistance rated smoke barrier enclosed lobby having direct access to an exit enclosure.

- Deletion of this unique to Massachusetts amendment (§909.20.5.1) would align the smokeproof enclosure and stair pressurization requirements in the 8th edition of 780 CMR with the 2009 IBC. There are no pending code change proposals before the ICC that endeavor to institute a similar smokeproof enclosure requirement in future editions of the IBC.

In light of the above information and considering the following, I respectfully request that the Board delete the proposed new Section 909.20.5.1.:

Submitted by:

Eric H. Cote, P.E.